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FOR COLLECTORS OF COINS, MEDALS, TOKENS AND PAPER MONEY

OCTOBER 2003

Mr. Longacre's Indian Head Cent

by Michael E. Marotta

A Commemorative in the Classic Mold

Arkansas State Quarter: It's Only Natural

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COVER STORY

U.S. COINAGE

32 ■ Mr. Longacre's Indian Head Cent

A coin design with an American slant proved popular and enduring.

Michael E. Marotta

COIN PHOTO: ANA MUSEUM/JOHN NEBEL

FEATURES

STATE QUARTERS

39 ■ Arkansas State Quarter: It's Only Natural

New quarter design gets to the heart of the state's riches.

Cathy L. Clark

MEDALLIC ART

43 ■ Requiem for the French Art Medal

A gathering of artists sensed a change of leadership in the field.

Donald Scarinci

LOVE TOKENS

50 ■ Hebrew Love Tokens

Numismatic mementoes carry precious messages.

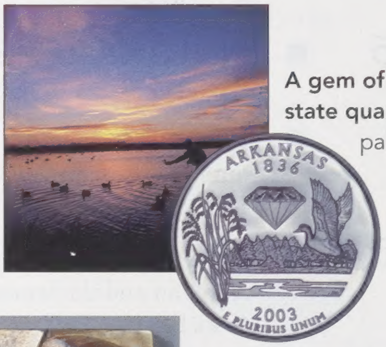
Simcha Kuritzky

COIN SCALES

55 ■ An Unusual Counterfeit Detector

A previously unknown measuring device has an ingenious design.

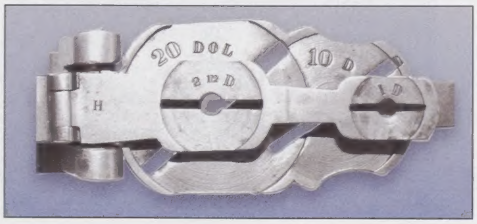
Eric P. Newman



A gem of a state quarter.
page 39

The state of the art medal.
page 43

Heartfelt messages.
page 50



An online find fills in the blanks.
page 55

Numismatist Contents *continued*

DEPARTMENTS

5 ■ **Editor's Desk**
Barbara J. Gregory

14 ■ **Letters**
Exploring ancients, legendary nickels, mediation success.
magazine@money.org

16 ■ **Contributors**

17 ■ **Internet Connections**
Expert advice, 24-7.
Michael E. Marotta

21 ■ **USA Coin Album**
A modern commemorative in the classic mold.
David W. Lange

25 ■ **Numismatist News & Notes**
Baghdad bread, "tough love" tokens and famed fliers.

61 ■ **Early American Money**
Fugio cents and their Wall Street connection.
John J. Kraljevich Jr.

65 ■ **About Ancients**
Aurelian and the lamentable state of Imperial coinage.
David R. Sear

103 ■ **Collector's Edge**
Don't be blasé about bullion.
Don Bonsers

109 ■ **Guest Editorial**
Warm welcome vs. cold shoulder.
Greg Heim

113 ■ **Other Side of the Coin**
The last U.S. Mint Director with real coinage experience.
Edward C. Rochette

115 ■ **Getting Started**
Buy direct from the source—the Mint.
Mitch Sanders

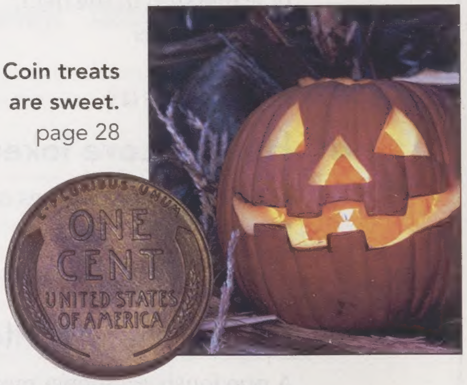
119 ■ **Quiz Quarters**
Author, author!
Charles Surasky

120 ■ **Pearlman's Perspectives**
The skinny on Walton's Liberty Head nickel.
Donn Pearlman

50 STATE QUARTERS
UNITED STATES MINT PROOF SET
UNITED STATES MINT PROOF SET
UNITED STATES MINT 50 STATE QUARTERS PROOF SET

The proof is in the mintage.
page 115

From mining to the Mint.
page 113



Coin treats are sweet.
page 28

Speculation and the Fugio cent.
page 61

An Unusual Counterfeit Detector

A surprising 1849 mechanism makes history in the realms of numismatics and metrology.

by Eric P. Newman LM619

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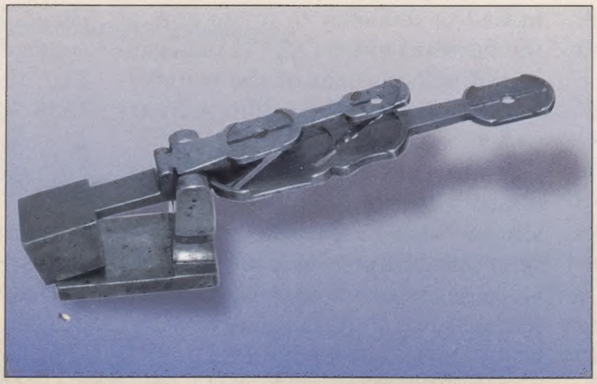
▲ Counterfeit detectors were used to assess the authenticity of gold coins.


◀ Figure 1: This previously unknown 1849 counterfeit detector, purchased in an online auction, features a swinging arm hinged to the balance beam, with coin holders on both.

FINDING A PREVIOUSLY unknown, mid 19th-century American gold coin counterfeit detector would be like discovering an extinct species of animal is very much alive. Recently, however, one such mechanical device came to light.

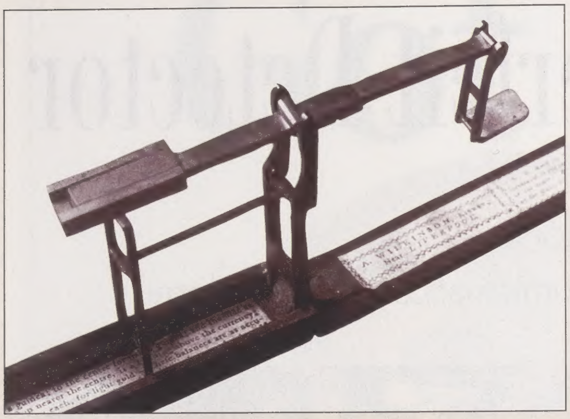
This newly located apparatus, made in late 1849, is distinctive in that it incorporates a swinging arm to accommodate some denominations of U.S. gold coins, while the balance beam to which that arm is hinged has holders for the others (Figure 1). A swinging arm containing coin holders had never before been invented or made for any such mechanism. Only a hint of the possible existence of such a detector was available, but that hint had gone unnoticed.

The circulation of counterfeit and altered precious-metal coins always has been a menace to commerce, and, until electronic testing became available, many mechanical weighing devices were developed, sold and used to help protect bankers, shops and itinerant merchants from being defrauded, particularly with regard to gold coinage. It was customary for merchandisers who moved from place to place on foot or by wagon to carry a small gold coin detector or tester in their pockets.

American Predecessors

To understand the unique status of the 1849 device, its precursors should be reviewed. During the American colonial period and well into the first half of the 19th century, equal-arm balances (small, pocket-sized devices or larger, countertop models) often were used to test the weight of foreign gold coins in American circulation. A set of small troy weights was employed in determining coin weights, and the resultant readings were compared to tables of specifications. The only other protection against counterfeit coins was careful observation and a simple "ring" test. (The coin was either tapped while balancing it on a finger or spun on a hard surface to see if it emitted a ringing sound.)

When casting, alloying and plating of counterfeits became much more sophisticated, improvements in testing accuracy were necessary. A ▶



▲ **Figure 2: This late 18th-century retractable English guinea and half guinea detector has a hinged turn and slider to adjust the moment of the coin being tested.**

counterfeit composed of metals lighter than gold could be slightly increased in diameter or thickness to produce the proper weight. (From 1804 to 1834, virtually no U.S.-minted gold coinage circulated because the intrinsic worth of the metal in such coins was greater than their face value. Thus counterfeits were not a problem at that time.)

Early English Detectors

Designers and mechanics in England constantly attempted to produce devices with which individuals could check the weight of counterfeit or worn coins. By the 18th century, pocket balances with a pan suspended by three strings from each of the two beam ends commonly were used to check the weight of both English and foreign gold coins circulating in England. To simplify the procedure, only one weight for each specific domestic or foreign coin was used, rather than a set of graduated, standard weights.

Coin weights usually had on one face an image or text describing the coin to which it corresponded, and on the other face the English sterling value of the coin. These thick, brass, coin-shaped weights usually were kept in the box or case with the scale.

By the late 18th century, an all-metal, retractable balance was developed to test the English guinea and half guinea. For convenience, it could be collapsed into a short, narrow wooden box that fit in a pocket. Some included a small rod, horizontally hinged to the counterweight side of the fulcrum, that could be swung into proper position for the coin denomination being tested. This was called a "turn" or "turnover." The beam sometimes contained a thin, sliding sleeve to test for weight loss due to circulation wear (Figure 2). According to Michael A. Crawford in his self-published reference *Sovereign Balances, Standard Rockers* (2001), there were many varieties of these retractable testers.

When foreign gold began to recede from circulation and the English sovereign and half sovereign replaced the guinea and half guinea in 1817, a sturdier and less complex detector emerged. Two horizontal gold coin holders were countersunk into one side of the balance beam, with a counterweight on the other. (The device was called a "rocker" because of its seesaw movement on the fulcrum.) When a genuine, full-weight coin was inserted into either holder, the "moment" (or tendency to rotate around the fulcrum) of that side of the beam would balance that of the counterweight on the other side. A lightweight coin would not do so.

Proper coin diameter could be assessed by the coin holder. A vertical slit, or "slot gauge," slightly larger than the thickness of a genuine coin was cut into each holder to aid in verifying a coin's thickness. A chord or arc commonly was cut away from the edge of each holder so that coins could be lifted out easily.

The First Detector for U.S. Gold Coinage

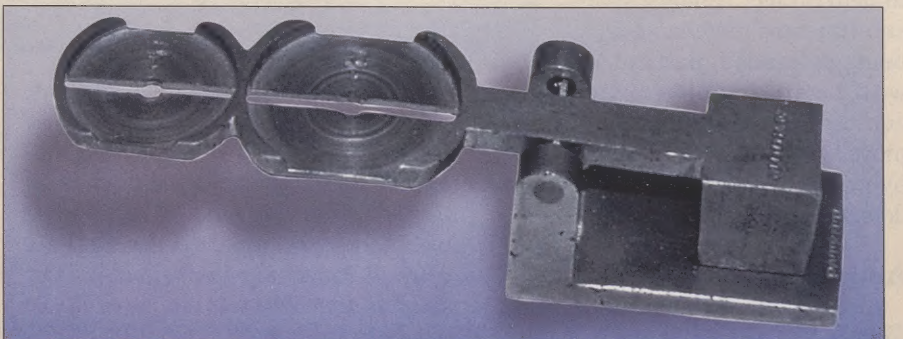
In 1834 Thomas H. Moore of Philadelphia made and sold the first American gold coin counterfeit detectors, copying the English rocker. Moore's device was intended to test the new U.S. $2½ (quarter eagle) and $5 (half eagle) gold coins that had been minted under the Act of June 28, 1834, with a slightly reduced weight, fineness and diameter. It did not provide for a U.S. $10 (eagle) gold coin because the denomination had not been struck since 1804.

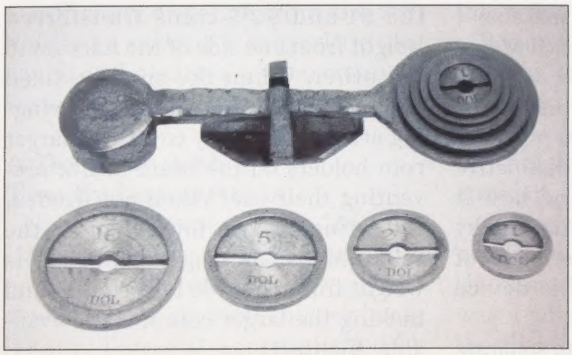
The detector was about 3.9 inches long and about 0.8 inches high, so it readily fit into a pocket or pouch (Figure 3). On some units, the manufacturer's name was punched into the counterweight. The word "PATENT" sometimes was stamped into the base of the detector, even though no patent was ever issued.

Effect of the California Gold Rush

Just prior to the major discoveries of gold in California in 1848, only three denominations of U.S. gold coinage were struck: the $2½, $5 and $10, the last being reintroduced in 1838. Because of the enormous quantity of California gold available for coinage, Congress authorized the

▼ **Figure 3: Manufactured by Thomas H. Moore, this 1834 "rocker" was intended for $2½ and $5 gold coins.**

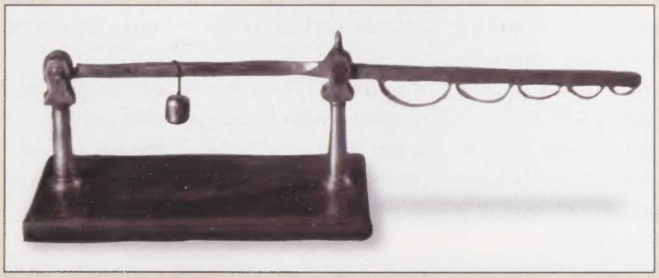




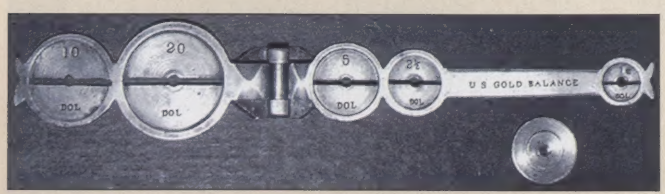
▲ **Figure 4: An 1850 detector for $20 gold coins was equipped with bushings that could be used to adapt the apparatus for other denominations.**

Mint to add $20 (double eagle) and $1 denominations pursuant to the Act of March 3, 1849.

With the increase in production of U.S. gold coinage and the hoped-for phasing out of foreign coins in circulation (many of which were legal tender), immediate and improved protection against counterfeit and altered U.S. gold coins was deemed advisable. It became apparent that new counterfeit detectors would have to accommodate the five sizes of gold coins that were, or about to be, placed in circulation.



▲ **Figure 5: The flexible straps on this 1850 Snider sliding poise balance help support the coins, which were inserted vertically in the beam.**



▲ **Figure 6: This 1850 Allender coin detector has a balance beam with coin holders on both sides of the fulcrum and a separate counterweight for adjustments.**

Development of New Detectors

The double eagle was 20 times heavier than the $1 gold piece. Therefore, a device similar to Moore's would require the distance from the fulcrum to the center point of the $1 gold coin holder to be 20 times farther than that for the $20, necessitating a balance beam of about 15 inches in length. To keep the beam length at a minimum, the $20 coin holder had to be positioned close to the fulcrum. Making a pocket-sized detector thus was a major challenge.

In 1849-50 several American mechanical designers attempted to solve the gold-coin testing problem in varying ways. An unidentified maker created a rocker for the $20 denomination, with a set of four, brass bushings or inserts for the $10, $5, $2½ and $1 gold coins (Figure 4). The bushings nested one inside the other for easy use and storage in pocket or store.

K & G Howard of Philadelphia made a pocket-sized, single-beam rocker to test the $5, $2½ and $1. Perhaps he made or planned to make an accompanying rocker to check the $20 and $10, but I am unaware of any such device. (Carrying two detectors would have been somewhat impractical.)

William N. Snider, a machinist who worked for the Philadelphia Mint, made an unusual gold coin counterfeit detector that would accept all five U.S. denominations. The coins were placed in a vertical position into slots cut through and along the center line of one side of the balance beam. The slots were aligned in close succession, with the $20 nearest the fulcrum.

The coins were supported in the slot from below by thin, flexible metal straps. The diameter and thickness of a coin could be checked simultaneously. On the other side of the fulcrum was a single sliding weight, or "poise," that could be moved horizontally along the beam into an appropriate, notched position to balance the denomination being tested. The notch for the highest denomination was farthest from the fulcrum, while the notches for the lower ones were closer. The countertop scale was mounted on a large, wooden base, the balance beam measuring about 13 inches.

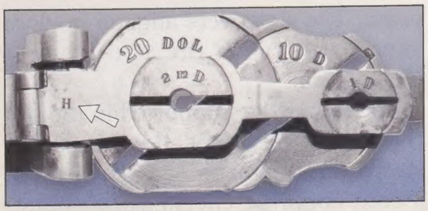
John Allender of New London, Connecticut, introduced a new concept in gold coin detectors, applying for a U.S. patent on March 26, 1850. He shortened the overall length of the balance beam by placing the holders for the $1, $2½ and $5 on one side of the fulcrum and those for the $10 and $20 on the other. A single weight placed in the $1 coin holder served as a counterbalance when either of the two large-denomination coins were being tested (Figure 6). The device was about 8.5 inches long, just a little larger than the desired pocket-size. A short, narrow brass base supported the fulcrum.

The Unknown Detector

The newly discovered device is attributed to George C. Howard because of its similarity in shape and workmanship to the aforementioned detectors produced by K & G Howard of Philadelphia, and the presence of the initial "H" punched into a hinged arm on the balance beam (Figure 7).

"G Howard" was first listed in Philadelphia directories in 1845 as a machinist at Broad and Paper streets. In later listings, the name broadened to George Howard and then George C. Howard. No "K Howard" was listed, but he may have been an older, skilled relative.

George Howard must have been very successful, because he soon occupied ⊙



▲ **Figure 7: A close-up of the newly discovered Howard gold coin detector reveals the initial "H" on the swinging arm, with the small-denomination coin holders overlapping those for the $10 and $20. Note the two diagonal slot gauges in the beam below.**

three lots on South 18th Street (below Market Street), and his occupation was listed as "mechanical engineer." He advertised in 1862 that he was a maker of tools for machinists, factories, railroad repair yards, etc. His listings ceased in 1880.

On Howard's 1849 detector, holders for the two smallest coin denominations were cut into the swinging arm attached to the balance beam; holders for the three largest denominations were cut into the beam itself. Allender demonstrated his familiarity with the Howard detector in his March 26, 1850, patent application:

> I am aware that balances for proving coin have been made with two levers hung upon one fulcrum so arranged as to weigh all the coins upon one side of said fulcrum, and when larger coins were weighed the lever in which the small ones are weighed is turned to the opposite side of the fulcrum. Therefore I make no claim to instruments constructed with more than one lever and to weigh upon one side of the fulcrum only.

Allender emphasized the distinctive features of his invention and how it differed from the rockers produced by Howard and others. However, some of his comments regarding his device were technically ambiguous.

It should be noted that two separate levers could be hung side by side on one fulcrum with different coin holders and each would operate independently. A swinging arm attached to or hinged on top of a basic lever constitutes only a part of a lever and is not a lever by itself because it does not exert a force on the opposite side of a fulcrum. When a swinging arm is turned to the opposite side of a fulcrum, the arm merely changes the moment on both sides of the fulcrum but still is a part of the basic balance beam or lever.

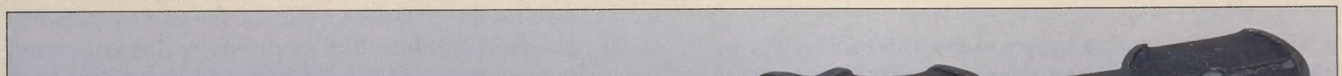
Allender wanted the Patent Office to know he was claiming originality for his way of testing some denominations on each side of the fulcrum without using a hinged arm attached to the balance beam. His exclusionary language obviously referred to the Howard detector that must have appeared shortly before. Allender's description of the earlier Howard detector was repeated verbatim in the language of the patent as issued on November 27, 1855.

The Howard detector was and is revolutionary and distinctive because the swinging arm that accommodates the $1 and $2½ coins transferred weight from one side of the fulcrum to the other. When the smaller-sized coin holders face upward, the swinging arm substantially covers the larger coin holders on the beam below, preventing their use. When not needed, the swinging arm folded across the fulcrum, transferring virtually all its weight from one side to the other and making the larger coin holders available (Figure 8).

The hinge on the swinging arm was attached to the beam almost over the top of the fulcrum, but slightly on the counterweight side. The weight of the arm had to be calculated with great care, because its positioning created a different moment on each side of the fulcrum. The countersinking of coin holders and the inclusion of slot gauges and finger cut-outs resulted in changes in beam weight and weight placement that could make the moment incorrect. Detector production required substantial and careful handiwork, increasing the cost.

To reduce the beam length, Howard slightly overlapped the $20 and $10 coin holders and placed them very close to the fulcrum The slot gauges were cut on the diagonal instead of along the centerline of the beam. Howard situated the $5 coin holder at

▼ **Figure 8: Here the Howard detector is shown with its hinged arm swung open to counterbalance the beam and make the $5, $10 and $20 coin holders available for use.**



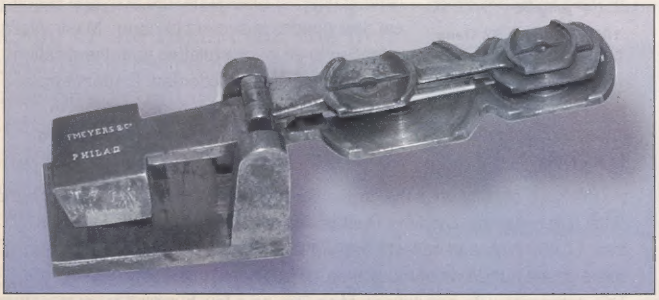
a sufficient distance from the $10 holder to permit a centerline slot gauge and create a proper moment when that $5 coin was tested.

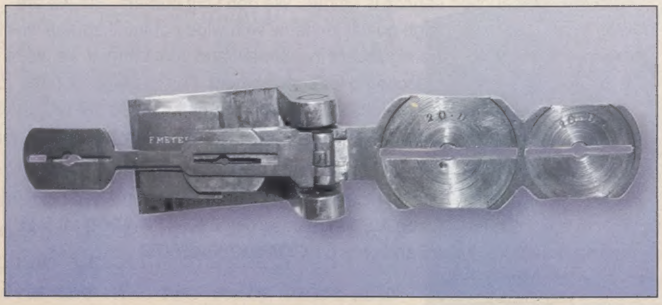
A Detector with Two Swinging Arms

Frederick Meyers (also "Meyer," "Myer" or "Myers") of Philadelphia promptly undertook development of a detector with an even shorter beam length. This was accomplished by adding a second swinging arm to accommodate the $5 coin holder, eliminating it from the end of the main balance beam (Figure 9).

This additional arm used the same hinge pin that held the first arm with the $2½ and $1 coin holders. The main balance beam therefore was shortened because it had only the $20 and $10 coin holders. This enabled the position of the $20 coin holder to be moved far enough away from the fulcrum to eliminate the overlap of the $10 coin holder and to normalize the in-line positions of the slot gauges.

▼ Figure 9: This 1850 Meyers detector has two swinging arms hinged at the balance beam, each with coin holders.





▲ Figure 10: Here both hinged arms of the Meyers detector are open, exposing the $20 and $10 coin holders. Overall, the device was about an inch shorter than the Howard apparatus.

Because Meyers transferred the position of the $5 coin holder from the balance beam to a second swinging arm, his device (Figure 10) was about an inch shorter than the Howard apparatus. The hinge pin for the two swinging arms on the Meyers device was located slightly toward the side of the main balance beam. The result was a small, very handy detector for the five denominations, but its production was labor-intensive, even more so than the Howard detector.

Emphasis on Thrift

Meanwhile, Allender stressed the low cost of his detector, which was priced at $1.50. He could have attached a small, hinged turnover in the space between the $2½ and $1 coin holders to take the place of the separate, small weight, but apparently was concerned about the extra production cost. In his U.S. patent application of March 26, 1850, he stated, "This apparatus can be made and sold cheaper than any other that will perform the same service with the same facility." (The cost factor is confirmed independently by a letter dated January 10, 1855, from the U.S. Mint to the Patent Office, which states that the price the Mint paid for an Allender detector was "trifling.")

In 1854 the Mint increased the diameter of the $1 and introduced the $3 denomination. Allender modified his detector, cutting a concentric depression in the existing $1 coin holder and adding a new $3 coin holder on the beam in the space adjacent to the $5 and $2½ holders. For those with older models, Allender made and sold a brass bushing of the proper weight and diameter (complete with the appropriate slot gauge) that fit into the $5 coin holder, enabling testing of the $3 coin. His remarkable detectors are in many numismatic and metrological collections today.

Conclusion

The Howard and Meyers detectors are represented by only one example each. This suggests that the public preferred Allender's devices for their economical price, even though they could not be carried easily in one's pocket, and the small, separate counterweight often was mislaid or lost. The rarity of the Howard and Meyers detectors also indicates that very few of them were made and sold. As is sometimes said in the medical profession, "The operation was a great success, but the patient died."

The newly found Howard detector now takes a distinguished place in American numismatic, metrological and Gold Rush history. Its status as a unique example may change with subsequent finds; if that should occur, the author would appreciate learning of such discoveries.

Acknowledgments

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